

What is claimed is:

1. A process for producing a high purity trialkanolamine
excelling in hue and having an APHA of not more than 40,
5 comprising:

a step of producing a mixed alkanolamine by a reaction
of an alkylene oxide with liquid ammonia in the presence of
a zeolite catalyst or by the reaction of an alkylene oxide
with liquid ammonia in the presence of the zeolite catalyst
10 and a reaction of an alkylene oxide with aqueous ammonia;

a step of removal of a low-boiling substance for removing
unreacted ammonia, water, a monoalkanolamine, and a
dialkanolamine from the mixed alkanolamine;

a step of removing a high-boiling substance, which have
15 a boiling point more than that of the trialkanolamine, by
subjecting the product deprived of the low-boiling substance
to vacuum distillation; and

a step of redistilling the distillate obtained by the
vacuum distillation.

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2. A process according to claim 1, wherein the unreacted
ammonia is removed by means of a pressure distillation and/or
nitrogen gas bubbling.

25 3. A process according to claim 1, wherein the water,
the monoalkanolamine, and the dialkanolamine are removed
continuously or batchwise by a vacuum distillation,
respectively.

30 4. A process according to claim 1, wherein the
redistillation is performed batchwise.

5. A process according to claim 1, wherein the redistillation is performed using a distillation column of empty.

5 6. A process according to claim 5, wherein a distillate obtained by the redistillation is classified into an initial fraction, an intermediate fraction, and a post fraction, and the intermediate fraction is gathered as a trialkanolamine product.

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7. A process according to claim 6, wherein the distillate is analyzed continuously or intermittently using an analyzer.

8. A process according to claim 1, wherein the reaction
15 requires at least part of the mixed alkanolamine to be recycled.

9. A process according to claim 1, wherein the mixed alkanolamine comprises a mono-, di-, and tri-alkanolamine.

20 10. A process according to claim 1, wherein the trialkanolamine is triethanolamine, the alkylene oxide ethylene oxide, the alkanolamine ethanol amine, the monoalkanolamine is monoethanolamine, and the dialkanolamine diethanolamine.

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11. A process for refining a trialkanolamine from a mixed alkanolamine obtained by a reaction of an alkylene oxide with ammonia, comprising:

a step of removing unreacted ammonia, water, a
30 monoalkanolamine, and a dialkanolamine from the mixed alkanolamine by fraction distillation to form a raw material trialkanolamine;

a step of adding to the raw material trialkanolamine a low-boiling compound having a boiling point less than that of the trialkanolamine prior to distillation; and

a step of distilling the resultant trialkanolamine.

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12. A process according to claim 11, wherein the low-boiling compound is at least one selected from the group consisting of water; alcohols; ketones; esters; diols; and halogenated hydrocarbons.

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13. A process according to claim 12, wherein the low-boiling compound is at least one selected from the group consisting of water; ethanol, methanol, propyl alcohol, isopropyl alcohol, butyl alcohol, and t-butyl alcohol; acetone and methylethyl ketone; ethylene glycol monoacetate and ethylene glycol monoethyl ether acetate; monoethylene glycol and diethylene glycol; and carbon tetrachloride.

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14. A process according to claim 13, wherein the low-boiling compound is at least one selected from the group consisting of water, the monoalkanolamine, and mixtures thereof.

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15. A process according to claim 11, wherein the unreacted ammonia is removed by means of a pressure distillation and/or nitrogen gas bubbling.

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16. A process according to claim 11, wherein the water, the monoalkanolamine, and the dialkanolamine are removed continuously or batchwise by a vacuum distillation, respectively.

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17. A process according to claim 11, wherein the mixed alkanolamine is obtained by a process for producing a mixed alkanolamine by a reaction of an alkylene oxide with liquid ammonia in the presence of a zeolite catalyst or by the reaction
5 of an alkylene oxide with liquid ammonia in the presence of the zeolite catalyst and a reaction of an alkylene oxide with aqueous ammonia.

18. A process according to claim 11, wherein the mixed
10 alkanolamine comprises a mono-, di-, and tri-alkanolamine.

19. A process according to claim 1, wherein the trialkanolamine is triethanolamine, the alkylene oxide ethylene oxide, the alkanolamine ethanol amine, the
15 monoalkanolamine is monoethanolamine, and the dialkanolamine diethanolamine.